



SEQUENCE LISTING

<110> Dalton, John  
Andrews, Stuart

<120> Vaccine Containing a Thiol Protease

<130> 1181-281

<140> 10/ 620,451

<141> 2003-07-17

<150> US 08/ 424,361

<151> 1995-05-25

<150> PCT/ GB93/ 02172

<151> 1993-10-21

<160> 23

<170> PatentIn version 3.2

<210> 1

<211> 20

<212> PRT

<213> Fasciola hepatica

<400> 1

Ala Val Pro Asp Lys Ile Asp Pro Arg Glu Ser Gly Tyr Val Thr Gly  
1 5 10 15

Val Lys Asp Gln  
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<210> 2

<211> 19

<212> PRT

<213> Bovine

<400> 2

Leu Pro Asp Ser Val Asp Trp Arg Glu Lys Gly Gly Val Thr Pro Val  
1 5 10 15

Lys Asp Gln

<210> 3

<211> 19

<212> PRT

<213> Gallus gallus

<400> 3

Ala	Pro	Arg	Ser	Val	Asp	Trp	Arg	Glu	Lys	Gly	Tyr	Val	Thr	Pro	Val
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Lys Asp Gln

<210> 4

<211> 19

<212> PRT

<213> Rattus norvegicus

<400> 4

Ile	Pro	Arg	Ser	Val	Asp	Trp	Arg	Glu	Lys	Gly	Tyr	Val	Thr	Pro	Val
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Lys Asp Gln

<210> 5

<211> 19

<212> PRT

<213> Homo sapiens

<400> 5

Ala	Pro	Arg	Ser	Val	Asp	Trp	Arg	Glu	Lys	Gly	Tyr	Val	Thr	Pro	Val
1				5					10					15	

Lys Asp Gln

<210> 6

<211> 19

<212> PRT

<213> Trypanosoma cruzi

<400> 6

Ala	Pro	Ala	Ala	Val	Asp	Trp	Arg	Ala	Arg	Gly	Ala	Val	Thr	Ala	Val
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Lys Asp Gln

<210> 7  
<211> 23  
<212> PRT  
<213> Schistosoma mansoni

<400> 7

Ile Pro Ser Asn Phe Asp Ser Arg Lys Lys Trp Pro Gly Cys Lys Ser  
1 5 10 15

Ile Ala Thr Ile Arg Asp Gln  
20

<210> 8  
<211> 14  
<212> PRT  
<213> Fasciola hepatica

<400> 8

Ala Val Pro Asp Lys Ile Asp Arg Arg Glu Ser Gly Tyr Val  
1 5 10

<210> 9  
<211> 15  
<212> PRT  
<213> Fasciola hepatica

<400> 9

Ala Val Pro Asp Lys Ile Asp Pro Arg Glu Ser Gly Tyr Val Thr  
1 5 10 15

<210> 10  
<211> 14  
<212> PRT  
<213> Gallus gallus

<400> 10

Ala Pro Arg Ser Val Asp Trp Arg Glu Lys Gly Tyr Val Thr  
1 5 10

<210> 11  
<211> 14  
<212> PRT  
<213> Rattus norvegicus

<400> 11

Ile Pro Arg Ser Val Asp Trp Arg Glu Lys Gly Tyr Val Thr  
1 5 10

<210> 12

<211> 14

<212> PRT

<213> Homo sapiens

<400> 12

Ala Pro Arg Ser Val Asp Trp Arg Glu Lys Gly Tyr Val Thr  
1 5 10

<210> 13

<211> 14

<212> PRT

<213> Bovine

<400> 13

Leu Pro Asp Ser Met Asp Trp Arg Glu Lys Gly Cys Val Thr  
1 5 10

<210> 14

<211> 14

<212> PRT

<213> Trypanosoma cruzi

<400> 14

Ala Pro Ala Ala Val Asp Trp Arg Ala Arg Gly Ala Val Thr  
1 5 10

<210> 15

<211> 16

<212> PRT

<213> Schistosoma mansoni

<400> 15

Ile Pro Ser Asn Phe Asp Ser Arg Lys Lys Trp Pro Gly Cys Lys Ser  
1 5 10 15

<210> 16

<211> 4

<212> PRT

<213> Artificial Sequence

<220>  
 <223> fluorogenic substrate

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 <222> (1)..(1)  
 <223> succinyl

<220>  
 <221> MISC\_FEATURE  
 <222> (4)..(4)  
 <223> 7-amino-4-methylcoumarin

<400> 16

Leu Leu Val Tyr  
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<210> 17  
 <211> 475  
 <212> DNA  
 <213> Fasciola hepatica

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 <223> n = any nucleotide

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 <222> (1)..(474)

<400> 17  
 cag gga aac tgt ngg ncc tgt tgg gca ttc tca aca acc ggt act atg 48  
 Gln Gly Asn Cys Xaa Xaa Cys Trp Ala Phe Ser Thr Thr Gly Thr Met  
 1 5 10 15  
 gag gga caa tat atg aaa aac gaa aaa act agt att tca ttc tct gag 96  
 Glu Gly Gln Tyr Met Lys Asn Glu Lys Thr Ser Ile Ser Phe Ser Glu  
 20 25 30  
 caa caa ctg gtc gat tgt agc ggt cct tgg gga aat aat ggt tgc agt 144  
 Gln Gln Leu Val Asp Cys Ser Gly Pro Trp Gly Asn Asn Gly Cys Ser  
 35 40 45  
 ggt gga ttg atg gaa aat gct tac caa tat ttg aaa caa ttt gga ttg 192  
 Gly Gly Leu Met Glu Asn Ala Tyr Gln Tyr Leu Lys Gln Phe Gly Leu  
 50 55 60  
 gaa acc gaa tcc tct tat ccg tac acg gct gtg gaa ggt cag tgt cga 240  
 Glu Thr Glu Ser Ser Tyr Pro Tyr Thr Ala Val Glu Gly Gln Cys Arg  
 65 70 75 80

tac aat agg cag ttg gga gtt gcc aaa gtg acc ggc tac tat act gtg	288
Tyr Asn Arg Gln Leu Gly Val Ala Lys Val Thr Gly Tyr Tyr Thr Val	
85 90 95	
cat tct ggc agt gag gta gaa ttg aaa aat cta gtc ggt tcc gaa gga	336
His Ser Gly Ser Glu Val Glu Leu Lys Asn Leu Val Gly Ser Glu Gly	
100 105 110	
cct gcc gcg atc gct gtg gat gtg gaa tct gac ttc atg atg tac agg	384
Pro Ala Ala Ile Ala Val Asp Val Glu Ser Asp Phe Met Met Tyr Arg	
115 120 125	
agt ggt att tat cag agc caa act tgt tta ccg ttc gct ctg aat cat	432
Ser Gly Ile Tyr Gln Ser Gln Thr Cys Leu Pro Phe Ala Leu Asn His	
130 135 140	
gca gtc ttg tct gtc ggt tat gga aca cag gat ggt act gnt t	475
Ala Val Leu Ser Val Gly Tyr Gly Thr Gln Asp Gly Thr Xaa	
145 150 155	

<210> 18  
 <211> 158  
 <212> PRT  
 <213> Fasciola hepatica

<220>  
 <221> misc\_feature  
 <222> (5)..(5)  
 <223> The 'Xaa' at location 5 stands for Arg, Ser, Gly, Trp, or Cys.

<220>  
 <221> misc\_feature  
 <222> (6)..(6)  
 <223> The 'Xaa' at location 6 stands for Thr, Ala, Pro, or Ser.

<220>  
 <221> misc\_feature  
 <222> (158)..(158)  
 <223> The 'Xaa' at location 158 stands for Asp, Gly, Ala, or Val.

<400> 18

Gln Gly Asn Cys Xaa Xaa Cys Trp Ala Phe Ser Thr Thr Gly Thr Met
1 5 10 15

Glu Gly Gln Tyr Met Lys Asn Glu Lys Thr Ser Ile Ser Phe Ser Glu
20 25 30

Gln Gln Leu Val Asp Cys Ser Gly Pro Trp Gly Asn Asn Gly Cys Ser
35 40 45

Gly Gly Leu Met Glu Asn Ala Tyr Gln Tyr Leu Lys Gln Phe Gly Leu  
50 55 60

Glu Thr Glu Ser Ser Tyr Pro Tyr Thr Ala Val Glu Gly Gln Cys Arg  
65 70 75 80

Tyr Asn Arg Gln Leu Gly Val Ala Lys Val Thr Gly Tyr Tyr Thr Val  
85 90 95

His Ser Gly Ser Glu Val Glu Leu Lys Asn Leu Val Gly Ser Glu Gly  
100 105 110

Pro Ala Ala Ile Ala Val Asp Val Glu Ser Asp Phe Met Met Tyr Arg  
115 120 125

Ser Gly Ile Tyr Gln Ser Gln Thr Cys Leu Pro Phe Ala Leu Asn His  
130 135 140

Ala Val Leu Ser Val Gly Tyr Gly Thr Gln Asp Gly Thr Xaa  
145 150 155

<210> 19  
<211> 477  
<212> DNA  
<213> Fasciola hepatica

<220>  
<221> misc\_feature  
<222> (1)..(477)  
<223> n = any nucleotide

<220>  
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<222> (1)..(477)

<400> 19  
cat caa gaa gcc cnn ggc tct tgt tgg gnt ttc tca aca aca ggt gct 48  
His Gln Glu Ala Xaa Gly Ser Cys Trp Xaa Phe Ser Thr Thr Gly Ala  
1 5 10 15  
atg gaa gga cag tat atg aaa aac caa aga act agt att tca tnc tct 96  
Met Glu Gly Gln Tyr Met Lys Asn Gln Arg Thr Ser Ile Ser Xaa Ser  
20 25 30  
gag caa caa ctg gtc gat tgt agc cgt gat ttt ggc aat tat ggt tgt 144  
Glu Gln Gln Leu Val Asp Cys Ser Arg Asp Phe Gly Asn Tyr Gly Cys

35	40	45	
aat ggt gga cta atg gaa	aat gca tac gaa tat ttg	aaa cga ttt gga	192
Asn Gly Gly Leu Met Glu	Asn Ala Tyr Glu Tyr Leu	Lys Arg Phe Gly	
50	55	60	
ttg gaa acc gag tct tct	tat cct tac agg gct gtg	gaa gga caa tgt	240
Leu Glu Thr Glu Ser Ser	Tyr Pro Tyr Arg Ala Val	Glu Gly Gln Cys	
65	70	75	80
cga tac aac gag cag ttg	gga gtt gcc aaa gtg act	agc tac tat acg	288
Arg Tyr Asn Glu Gln Leu	Gly Val Ala Lys Val Thr	Ser Tyr Tyr Thr	
85	90	95	
gta cat tct gga gat gag	gta gaa ttg caa aat cta	gtc ggt gcc gaa	336
Val His Ser Gly Asp Glu	Val Glu Leu Gln Asn Leu	Val Gly Ala Glu	
100	105	110	
gga cct gct gcg gtc gct	ttg gat gtg gag tca gac	ttc atg atg tac	384
Gly Pro Ala Ala Val Ala	Leu Asp Val Glu Ser Asp	Phe Met Met Tyr	
115	120	125	
agg agt ggt att tat cag	agc caa act tgt tca ccg	gat cgt ttg aac	432
Arg Ser Gly Ile Tyr Gln	Ser Gln Thr Cys Ser Pro	Asp Arg Leu Asn	
130	135	140	
cat gga gtg ttg nct gtc	gnt tat gga acn cag ggt	ggt nct cnc	477
His Gly Val Leu Xaa Val	Xaa Tyr Gly Thr Gln Gly	Gly Xaa Xaa	
145	150	155	

<210> 20  
 <211> 159  
 <212> PRT  
 <213> Fasciola hepatica

<220>  
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 <222> (5)..(5)  
 <223> The 'Xaa' at location 5 stands for Gln, His, Arg, Pro, or Leu.

<220>  
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 <222> (10)..(10)  
 <223> The 'Xaa' at location 10 stands for Asp, Gly, Ala, or Val.

<220>  
 <221> misc\_feature  
 <222> (31)..(31)  
 <223> The 'Xaa' at location 31 stands for Tyr, Cys, Ser, or Phe.

<220>  
 <221> misc\_feature  
 <222> (149)..(149)  
 <223> The 'Xaa' at location 149 stands for Thr, Ala, Pro, or Ser.



<220>  
 <221> misc\_feature  
 <222> (151)..(151)  
 <223> The 'Xaa' at location 151 stands for Asp, Gly, Ala, or Val.

<220>  
 <221> misc\_feature  
 <222> (158)..(158)  
 <223> The 'Xaa' at location 158 stands for Thr, Ala, Pro, or Ser.

<220>  
 <221> misc\_feature  
 <222> (159)..(159)  
 <223> The 'Xaa' at location 159 stands for His, Arg, Pro, or Leu.

<400> 20

His Gln Glu Ala Xaa Gly Ser Cys Trp Xaa Phe Ser Thr Thr Gly Ala  
 1 5 10 15

Met Glu Gly Gln Tyr Met Lys Asn Gln Arg Thr Ser Ile Ser Xaa Ser  
 20 25 30

Glu Gln Gln Leu Val Asp Cys Ser Arg Asp Phe Gly Asn Tyr Gly Cys  
 35 40 45

Asn Gly Gly Leu Met Glu Asn Ala Tyr Glu Tyr Leu Lys Arg Phe Gly  
 50 55 60

Leu Glu Thr Glu Ser Ser Tyr Pro Tyr Arg Ala Val Glu Gly Gln Cys  
 65 70 75 80

Arg Tyr Asn Glu Gln Leu Gly Val Ala Lys Val Thr Ser Tyr Tyr Thr  
 85 90 95

Val His Ser Gly Asp Glu Val Glu Leu Gln Asn Leu Val Gly Ala Glu  
 100 105 110

Gly Pro Ala Ala Val Ala Leu Asp Val Glu Ser Asp Phe Met Met Tyr  
 115 120 125

Arg Ser Gly Ile Tyr Gln Ser Gln Thr Cys Ser Pro Asp Arg Leu Asn  
 130 135 140

His Gly Val Leu Xaa Val Xaa Tyr Gly Thr Gln Gly Gly Xaa Xaa

145

150

155

<210> 21  
 <211> 472  
 <212> DNA  
 <213> Fasciola hepatica

<220>  
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 <222> (1)..(472)  
 <223> n = any nucleotide

<220>  
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 <222> (1)..(471)

<400> 21

gcg aaa tgt ggt tcc tgt tgg gca ttc tca aca acc ggt act atg gag 48  
 Ala Lys Cys Gly Ser Cys Trp Ala Phe Ser Thr Thr Gly Thr Met Glu  
 1 5 10 15

gga caa tat atg aaa aac gaa aaa act agt ntt tca ncc tct gag caa 96  
 Gly Gln Tyr Met Lys Asn Glu Lys Thr Ser Xaa Ser Xaa Ser Glu Gln  
 20 25 30

caa ctg gtc gat tgt agc ggt cct tgg gga aat aat ggt tgc agt ggt 144  
 Gln Leu Val Asp Cys Ser Gly Pro Trp Gly Asn Asn Gly Cys Ser Gly  
 35 40 45

gga ttg atg gaa aat gct tac caa tat tta aaa caa ttt gga ttg gaa 192  
 Gly Leu Met Glu Asn Ala Tyr Gln Tyr Leu Lys Gln Phe Gly Leu Glu  
 50 55 60

acc gaa tcc tct tat ccg tac acg gct gtg gaa ggt cag tgt cga tac 240  
 Thr Glu Ser Ser Tyr Pro Tyr Thr Ala Val Glu Gly Gln Cys Arg Tyr  
 65 70 75 80

aat agg cag ttg gga gtt gcc aaa gtg act ggc tac tat act gtg cat 288  
 Asn Arg Gln Leu Gly Val Ala Lys Val Thr Gly Tyr Tyr Thr Val His  
 85 90 95

tct ggc agt gag gca gga ttg aaa aat cta gtc ggt tcc gaa gga cct 336  
 Ser Gly Ser Glu Ala Gly Leu Lys Asn Leu Val Gly Ser Glu Gly Pro  
 100 105 110

gcc gcg atc gct gtg gat gtg gaa tct gac ttc atg atg tac agg agt 384  
 Ala Ala Ile Ala Val Asp Val Glu Ser Asp Phe Met Met Tyr Arg Ser  
 115 120 125

ggt att tat cag anc caa act tgt tta ccg ttc gct ttg aat cat gca 432  
 Gly Ile Tyr Gln Xaa Gln Thr Cys Leu Pro Phe Ala Leu Asn His Ala  
 130 135 140

gtc ttg nct gtc gat tat gga aca cag gat ggt nac ncc c  
 Val Leu Xaa Val Asp Tyr Gly Thr Gln Asp Gly Xaa Xaa  
 145 150 155

472

<210> 22  
 <211> 157  
 <212> PRT  
 <213> Fasciola hepatica

<220>  
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 <222> (27)..(27)  
 <223> The 'Xaa' at location 27 stands for Ile, Val, Leu, or Phe.

<220>  
 <221> misc\_feature  
 <222> (29)..(29)  
 <223> The 'Xaa' at location 29 stands for Thr, Ala, Pro, or Ser.

<220>  
 <221> misc\_feature  
 <222> (133)..(133)  
 <223> The 'Xaa' at location 133 stands for Asn, Ser, Thr, or Ile.

<220>  
 <221> misc\_feature  
 <222> (147)..(147)  
 <223> The 'Xaa' at location 147 stands for Thr, Ala, Pro, or Ser.

<220>  
 <221> misc\_feature  
 <222> (156)..(156)  
 <223> The 'Xaa' at location 156 stands for Asn, Asp, His, or Tyr.

<220>  
 <221> misc\_feature  
 <222> (157)..(157)  
 <223> The 'Xaa' at location 157 stands for Thr, Ala, Pro, or Ser.

<400> 22

Ala Lys Cys Gly Ser Cys Trp Ala Phe Ser Thr Thr Gly Thr Met Glu  
 1 5 10 15

Gly Gln Tyr Met Lys Asn Glu Lys Thr Ser Xaa Ser Xaa Ser Glu Gln  
 20 25 30

Gln Leu Val Asp Cys Ser Gly Pro Trp Gly Asn Asn Gly Cys Ser Gly  
 35 40 45

Gly Leu Met Glu Asn Ala Tyr Gln Tyr Leu Lys Gln Phe Gly Leu Glu

50		55		60											
Thr	Glu	Ser	Ser	Tyr	Pro	Tyr	Thr	Ala	Val	Glu	Gly	Gln	Cys	Arg	Tyr
65					70					75					80
Asn	Arg	Gln	Leu	Gly	Val	Ala	Lys	Val	Thr	Gly	Tyr	Tyr	Thr	Val	His
				85					90					95	
Ser	Gly	Ser	Glu	Ala	Gly	Leu	Lys	Asn	Leu	Val	Gly	Ser	Glu	Gly	Pro
			100					105					110		
Ala	Ala	Ile	Ala	Val	Asp	Val	Glu	Ser	Asp	Phe	Met	Met	Tyr	Arg	Ser
		115					120					125			
Gly	Ile	Tyr	Gln	Xaa	Gln	Thr	Cys	Leu	Pro	Phe	Ala	Leu	Asn	His	Ala
	130					135					140				
Val	Leu	Xaa	Val	Asp	Tyr	Gly	Thr	Gln	Asp	Gly	Xaa	Xaa			
145					150					155					
<210> 23															
<211> 12															
<212> PRT															
<213> Fasciola hepatica															
<400> 23															
Ala	Val	Pro	Asp	Lys	Ile	Asp	Arg	Arg	Glu	Ser	Gly				
1				5					10						